

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

ORDER NO. 88-044

UPDATED WASTE DISCHARGE REQUIREMENTS FOR:

CHEVRON U.S.A., INC.,
RICHMOND REFINERY
RICHMOND, CONTRA COSTA COUNTY

The California Regional Water Quality Control Board, San Francisco Bay Region, hereinafter called the Board, finds that:

1. Chevron U.S.A. Inc., hereinafter called the discharger, owns and operates the Richmond Refinery in Contra Costa County as shown in Figure 1. This petroleum refinery, built at the turn of the century, is one of the largest and most complex refineries in the western United States. Over 300 different products have been produced here including gasoline, jet fuel, fuel oils, diesel, lube oil, waxes, asphalt, liquefied petroleum gas, chemicals, thinners, solvents, and catalysts. Wastes generated from these processes have been deposited at various areas around the refinery at different times in the past. This Order addresses five Land Treatment units, two Class I surface impoundments, five Class II surface impoundments, and thirteen other waste management units. The Class II surface impoundments are operating units. The Land Treatment units and one of the Class I surface impoundments are defined as existing units because they were in operation at the time California Administrative Code, Title 23, Chapter 3, Subchapter 15, hereinafter called Subchapter 15, became effective. These existing units are not accepting waste at the present time. The second Class I surface impoundment and the other thirteen units are defined as inactive because they were not in operation on the effective date of Subchapter 15. The Order also addresses sixteen additional areas of potential concern to water quality.
2. The discharge of approximately 13 million gallons per day of process waste water from the facility is regulated by Board Order No. 87-073, NPDES Permit No. CA0005134.
3. Geologically, the Richmond Refinery is located within a northwest trending trough between the San Pablo and Hayward faults. Cycles of sea level fluctuation in the Pleistocene resulted in deposition of complex interfingering alluvial and estuarine sediments. Three hydrogeologic zones have been identified within the top 150 feet of sediments at the site. The water table aquifer, the A zone, occurs within the fill, the peat rich zones of younger bay mud, the younger bay mud and the older bay mud. These sediments generally have low hydraulic conductivity and are as great as 60 feet thick in the northwestern portion of the refinery and pinch out to the south east. The water table is found within two to ten feet of the ground surface and discharges into the Bay. The water is brackish.

The next hydrogeologic zone, the C zone, is an 80-90 foot thick zone of interfingering alluvial and estuarine sediments. These sediments generally have low hydraulic conductivity, but permeable units occur as channels and lenses. The permeable units have not been correlated across the site, but the entire zone appears to be hydraulically interconnected. The water is brackish, occurs under artesian conditions and discharges to the Bay.

The next zone, the B zone, is a relatively permeable unit at approximately 100 feet below the ground surface. It ranges from 5 to 15 feet thick and contains potable water, but of limited production capacity. The B zone occurs under artesian conditions, appears to be hydraulically separate from the overlying zones, and also discharges to the Bay.

There have been at least three other water bearing zones identified at depth below the B zone, but because of their physical separation from the surface, they have not been critically evaluated.

There have been 147 groundwater monitoring wells installed throughout the refinery to monitor potential releases from different units to these three groundwater zones.

4. Waste Discharge Requirements were issued on September 9, 1981, in Board Order No. 81-55. Order No. 81-55 was amended on September 21, 1983, by Order 83-13. These Orders addressed four on-site disposal areas: the Landfarms, Landfill 15, the Hydrofluoric Acid Pits; and Pollard Pond. The sites are described in the following findings.
5. The operating waste management units are listed and described below.
 - a. Waste Water Treatment Ponds System is composed of 5 ponds totaling approximately 265 acres. Process wastewater is piped to oil/water separators where oil is skimmed off and some solids settle out. Storm water is also piped to the separators, or may be discharged directly to the pond system. Approximately 13 million gallons per day of wastewater is treated in these ponds and discharged to the Bay (See Finding 2).

The No. 1 Oxidation Pond is the largest of the 5 ponds, covering 116 acres. It was built in 1959. This pond received process water and storm water runoff. Its main purpose was to provide surge capacity prior to discharge to the Bioreactor. The discharger performed sampling and analysis of the pond waters and sludges in 1985. This program determined that the pond sludges were not hazardous wastes. Concentrations of metals and organic pollutants in the sludges were found to be such that the wastes may pose a threat to water quality under ambient conditions. These wastes are considered by Board staff to be designated wastes.

The 50/100 foot channel is a narrow collection channel located downstream of separators 1, 2, 15, and CPI, in the southern part of the refinery. Sampling and analysis of the wastes in this channel in 1985 found the wastes to be not hazardous. Board staff considers this waste to be a designated waste. With the installation of the

new oil/water separators, the 50/100 foot channel will no longer be used to conduct process water to the bioreactor. Instead the discharger is considering converting the 50/100 foot channel for use in conducting non-contaminated storm water runoff to the Bay.

The Bioreactor was excavated to approximately -40 feet MSL by the discharger in the early 1900's to be used as a turning basin for ships. The Bioreactor is 30 acres in area and is the pond in which almost all of the treatment occurs within the system. Biodegradation is enhanced by 1100 aerators and the system of baffles in the pond. Sampling and analysis of this pond in 1985 determined that it did not contain hazardous wastes. Board staff considers these wastes to be designated wastes.

The No. 2 Oxidation pond, downstream of the Bioreactor, covers 89 acres. It was built in 1963 and has been used for final polishing of the wastewater prior to discharge to the Bay. Sampling and analysis of the pond waters and sludges in 1985 determined that this pond does not contain hazardous wastes. Board staff considers these wastes to be designated wastes.

The 250 foot channel was excavated to -40 feet MSL to be used as a shipping channel during the early 1900's. The use of this facility for wastewater treatment commenced in the 1950's when the dam at the outlet of the channel was built. The 250 foot channel covers approximately 25 acres and was used as the final conduit for waters discharged to the Bay. Once through salt cooling water passes through this channel and was previously mixed with water from the No. 2 Oxidation pond, and Chevron Chemical's NPDES discharge before ultimate discharge to the Bay. Since the discharger has built the deep water outfall, only once through salt cooling water passes through the 250 foot channel. Sampling and analysis of this channel in 1985 determined that it did not contain hazardous wastes. Board staff considers this waste to be designated waste.

The wastewater treatment ponds are Class II waste management units. All of the ponds are unlined. They do not meet the current siting and construction requirements of Subchapter 15. There is limited groundwater monitoring currently being conducted at the waste water treatment pond system.

6. Existing waste management units that are subject to Subchapter 15 are listed and described below. These units have accepted waste since the effective date of the Subchapter 15 regulations, but are currently inactive.
 - a. Landfarms (land treatment units) are divided into two sections. Landfarm No. 1 is 13.5 acres and is located on the west side of the 250 foot channel and south of the No. 1 Oxidation pond. A second section, Landfarms 2-5, are located east of the 250 foot channel and south of the No. 2 Oxidation pond. These units are 8, 3.5, 3, and 1 acres, respectively. The landfarms were built in the mid-seventies by placing clean fill over existing waste management units which contained slop oil solids, leaded tank bottoms, oil/water separator sludge, phthalic anhydride bottoms,

and other wastes. The landfarms have been used to biologically treat an annual average of 30,000 tons of non-leaded tank bottom sludges, oil water mixtures and sludges from separators, oily dirt, algae and oil from effluent treatment pond skimmings, and effluent pond dredgings and contaminated soil.

The unit does not meet current siting, construction, and groundwater monitoring requirements. The unit does not have adequate separation between wastes and groundwater and does not have an adequate groundwater and unsaturated zone monitoring program. Waste constituents have been detected in the groundwater adjacent to the site. The Environmental Protection Agency (EPA) has required that the discharger cease disposing of wastes to the landfarms after January 1, 1988.

Numerous volatile, semi-volatile, and acid and base/neutral extractable organic compounds have been detected in many wells at the site. The discharger is presently investigating the extent of pollutants originating from the landfarms and/or the old waste disposal areas beneath them.

- b. Hydrofluoric Acid Pits (hydropits)/Schaeffer Slough received wastewater from the facility's Alkane Plant at a rate of 150,000 gallons/day. The waste stream contained neutralized hydrofluoric acid, fluoride salts, and small amounts of oil. Benzene is a known constituent of the waste. The hydropits contained saltwater which stimulated the precipitation of fluoride salts such as magnesium fluoride and calcium fluoride. These precipitates were excavated on an annual basis and shipped to an off-site Class I disposal site. The date of startup of the units is unknown. The hydropits have not received waste since July 1986 and are currently being closed. The unlined pits consist of three small surface impoundments with a total area of 200 ft. by 150 ft. and a depth of 6 ft. and are located on the shore of San Pablo Bay. The hydropits are Class I surface impoundments. Schaefer Slough is a ditch which carried the effluent from the hydropits to the No. 13 oil/water separator for eventual discharge to the waste water treatment system. The slough was 450 ft. long with a width of 6 ft. and a depth of 4 ft.

There are 12 monitoring wells installed to monitor the Hydropit/Schaefer Slough area. Wells downgradient of the hydropits and Schaefer Slough have detected fluoride and benzene. Fluoride and benzene concentrations have also been identified beneath the Alkane plant which is located 300 ft. upgradient of the Hydropit/Schaefer Slough area. Therefore the source of benzene and fluoride in the Alkane Plant/Hydropits area is difficult to distinguish.

The closure process for the Hydropits and Schaeffer Slough is under way, in accordance with approved preliminary closure plans, although a complete closure plan has not been submitted. Closure activities have included excavating six ft. of soil beneath the slough and disposal of the excavated soils within

the hydropits. The slough has been replaced with a pipe for a segregated stormwater project. The discharger is currently preparing a closure plan which will address the extent of pollutants in the area and the corrective action required.

7. Inactive waste management units are listed and described below. These units have not accepted wastes since the effective date of the Subchapter 15 regulations.

- a. Pollard Pond is a surface impoundment located in the northwestern portion of the refinery. The pond is triangularly shaped, approximately 500 ft. by 400 ft. by 650 ft. on a side and 17 ft. deep. 30,000 cubic yards of sulfuric acid sludges were deposited in 1949, and 29,000 cubic yards of bay mud dredge spoils were deposited in 1967. The acid sludge has an asphalt-like consistency; a very low pH (less than 2); contains volatile, semi-volatile, acid and base-neutral extractable organic compounds; and non-hazardous levels of metals. Samples of the liquid material in the surface impoundment have failed bioassay tests. The sludge is a hazardous waste due to its pH. This site is a Class I surface impoundment.

There are 12 groundwater monitoring wells at the site. Oily material has been found floating on the groundwater and waste constituents have been detected in the groundwater. A closure plan has been submitted for the site.

- b. Landfill 15 is a 33 acre site, with an estimated capacity of 270,000 cubic yards, which in the past has been operated as an unlined surface impoundment. Hazardous wastes such as separator and paint sludge, were disposed in the surface impoundment prior to the 1980's. Other wastes such as resins, water treatment sludges, catalyst fines, filter clays and non-hazardous wastes such as clean fill, lime, dredge spoils and sulfur have also been disposed of at the landfill in the 1980's. The date of startup of operation of this unit is unknown. The landfill is no longer used for waste disposal. A closure plan was submitted in March 1983.

Two groundwater monitoring wells were installed at the site. Additional wells are necessary at this site for adequate monitoring.

- c. Phthalic Anhydride Disposal Site was used for the disposal of phthalic anhydride bottoms generated by the refinery. The unit was approximately 300 ft. by 300 ft. with a depth of 10 ft. and a capacity of 32,000 cubic yards. Waste disposal commenced in the 1960's. In 1974, the area was covered with clean fill and an earthen dike with a clay core was constructed along the western margin of the site. The southern and eastern boundaries of the site are adjacent to Chevron Chemical's Aspemix cutoff wall.

Two wells were installed in the area previously used for disposal of phthalic anhydride bottoms. These wells showed elevated levels of TOC, TOX, phthalic anhydride, and tetrahydrophthalic anhydride. Wells drilled a few hundred feet north and west of the disposal area showed very low levels of phthalic anhydride and tetrahydrophthalic anhydride. A closure plan has not been submitted.

- d. The Old City Dump is located approximately 2000 feet north of the No. 2 Oxidation Pond. This property was purchased from the City of Richmond and all waste disposal operations occurred prior to transfer of ownership. The dump was 600 ft. by 450 ft. by 7 ft. deep and had a capacity of 56,000 cubic yards. There is no information available as to the date of startup, date of closure, closure activities at the site, the wastes managed at the site, or history of releases. There is limited groundwater monitoring at the site.
- e. Gertrude Street/Bonner Brothers Site. This site is approximately 150 ft. by 800 ft. and is located in the northeastern section of the refinery. The date of startup is unknown, but the discharger purchased the property in 1961 and continued a lease to the Bonner Brothers, who operated an auto dismantling, drum reconditioning and general junk yard up until 1984. In 1984, the discharger disposed of the above ground barrels, the scrap metal, junk cars, and miscellaneous debris to an appropriate disposal site. 103 buried drums were also found at the site and were removed to an appropriate waste disposal site. During 1985 the site was graded to contain stormwater runoff and 60 composite soil samples were collected from each 25 by 25 foot area. The results of soil sampling detected leachable quantities of lead above hazardous values, and various priority and non-priority pollutants including, PCB's, pesticides, and petroleum hydrocarbons. The results of the soil sampling are difficult to interpret because it is unclear where each sample was collected and how it was composited. The soil sampling did not define the lateral and vertical extent of waste migration at the site. Three groundwater monitoring wells were installed along the western boundary of the site. One round of water quality samples was collected in January of 1987. No waste constituents were detected, however groundwater gradients in this area have not been well defined. A closure plan for the site has not been submitted.
- f. Pond 11 was used in the operation of the Drum Reconditioning Plant prior to 1980 although the exact date of startup is unknown. One waste stream originating from the Drum Reconditioning Plant was discharged to Pond 11. It is believed that Pond 11 received an oily waste stream from the plant which may have contained some paint sludge. The wastewater was allowed to settle in the pond and the sludge subsequently hauled off site for disposal. The pond's dimensions were 150 ft. in length, 50 ft. in width and 4 ft. in depth. There are no details on the construction of the pond. The pond has been subsequently filled in and leveled. Groundwater monitoring is

not being conducted at the site and a closure plan has not been submitted.

- g. Pond 13 was used to store fluoride salts originating from the hydropits before the salts were removed for off-site disposal. The pond had a capacity of 28,000 cubic yards and was 500 ft. in length, 450 ft. in width and 4 ft. in depth. The site was used for at least 40 years and it is believed that no wastes were disposed of in the impoundment since at least 1977. In 1980 and 1981 wastes and contaminated soils were removed until the fluoride concentration in the remaining soils was less than 1800 ppm, as approved by the State Department of Health Services. A lube oil plant has been subsequently built over Pond 13. One monitoring well has been installed adjacent to the site but the well has not been monitored for fluoride.
- h. Pond 14 was used as a settling basin for paint sludges from the barrel reconditioning plant from 1969 to 1979. In the Reconditioning Plant drums were washed in caustic solution to remove the paint. Paint sludge with large amounts of water was then transferred to the pond. Solids accumulated in the bottom of the impoundment, while the overlying water was allowed to overflow through a weir structure and enter the waste water treatment ponds. Solids were removed annually and taken to an off-site Class I disposal facility. Prior to use of the unit for paint sludges, it was used for disposal of magnesium hydroxide and calcium carbonate generated by the Spaulding unit. The pond has a capacity of 4,300 cubic yards, and is triangular in shape with dimensions of 220 ft. on all sides. The impoundment is 5 ft. in depth.

In the fall of 1980 all wastes were removed from the pond as well as some of the underlying soils. The discharger has proposed to leave the remaining contaminated soil in place, add fill as necessary to provide drainage to the 50/100 Foot Channel, and pave the site. Data on the vertical and horizontal extent of the residual soil contamination was generated. There was no data on the soluble concentrations of the remaining soils.

Four monitoring wells have been installed around the site. Groundwater monitoring for metals was conducted at one time although no regular monitoring has been conducted. The sample results are inconclusive.

- i. Tetraethyl Lead (TEL) Site was a 40 ft. by 60 ft. by 4 ft. surface impoundment with a capacity of 300 cubic yards which was located south of the No. 1 Oxidation pond. Up to 2,000 barrels per year of tank bottom sludges containing up to 100 ppm of tetraethyl lead were disposed of during the 1970's. The wastes from this unit were removed in 1980. Five feet of sludge and soils were removed. Organic lead was not detected in the remaining soils. Total inorganic lead was detected in the remaining soils at up to 189 ppm. The No. 1 landfarm was expanded over the TEL site in the early 1980's. Groundwater

monitoring is not currently conducted at the site.

- j. Big Wheels Site was used as a holding area for slop oil emulsion prior to that material being landfarmed. It is located near the eastern end of No. 1 Landfarm and was a pit measuring 40 ft. in length, 15 ft. in width, 4 ft. in depth with a capacity of 80 cubic yards. A closure plan submitted in 1981 proposed to removal all liquid and solid wastes and contaminated soil, backfill the area with clean fill and incorporate the site within the Landfarm. The status of closure is unknown. The monitoring wells installed to monitor the No. 1 Landfarm may be appropriate to monitor potential releases from the Big Wheels Site.
- k. Landfill under Isomax and No. 1 Landfarm holds approximately 400,000 cubic yards of waste material and clean fill and is approximately 3000 ft. by 500 ft. It stretches along the southern shoreline of the No. 1 Oxidation Pond. This area was used for the disposal of slop oil solids, separator sludge, leaded tank bottoms, and other wastes during early refinery operations. The date of startup and date of closure, and the presence of any release controls are unknown. This unit may be the source of floating petroleum hydrocarbons found in the groundwater monitoring wells and the soils in the area of Landfarm #1. There is no groundwater monitoring program specifically designed for this site.
- l. Landfill under Landfarms 2 and 3 held approximately 80,000 cubic yards of waste material and clean fill and is approximately 1200 ft. by 600 ft. The site was used for the disposal of various refinery wastes including concrete, clay pipe, oily tank sludges, and phthalic anhydride bottoms. This site is completely covered by Landfarms 2 and 3 and may be the source of the groundwater pollution that is found in the area. There is no information on the date of startup and the date of closure of this site. There is also no information on environmental release controls.
- m. Old Drum Storage Facility was approximately 180 ft. by 90 ft., with a reported capacity of 2448 drums. The date of startup is unknown, but the facility was used until December 1984 to store drums awaiting off-site disposal. The unit was closed in accordance with a DHS approved closure plan and is now covered with an asphaltic concrete cap and has diversion ditches to channel runoff/runoff to an existing ditch. Soils containing waste constituents below the hazardous levels were left in place at closure. The drummed wastes contained cyanides and sulfides, acidic materials, reactive metals and water reactive wastes, flammable hydrocarbons and solvents, and oxides. There is no groundwater monitoring program for this site.
- n. Pond 13A was also used for the storage of fluoride salts from the hydropits. The unit had a capacity of 800 cubic yards, with dimensions of 75 ft. by 60 ft. by 5 ft. deep. The site was used over a 40 year period with storage ending in 1977. In 1982 the

pond was flooded with a lime and water mixture to neutralize the waste and precipitate the fluorides as an insoluble calcium fluoride. Closure activities for Pond 13A have included excavating 6 ft. of soil and backfilling with clean fill. Monitoring wells downgradient of Schaefer Slough, which have detected fluoride and benzene, monitor the effects on groundwater from Pond 13A.

8. There are a number of surface impoundments at the refinery which are used to manage storm water which is either directly discharged to the Bay or is discharged to the wastewater treatment system. It is unknown if these basins have contained spills or waste in the past.
 - a. Lake Schramm is a surface impoundment 100 ft. by 50 ft. by 8 ft. deep. It is located 2000 ft. southwest of the No. 1 Oxidation Pond. This unlined surface impoundment was used for the disposal of 600 cubic yards of leaded tank bottoms (13% oil, and 120 ppm lead) in 1980. It is not known whether the site was ever used for another purpose. 1300 cubic yards of material were removed from the site in 1981. It is currently being used to contain storm water runoff from the north-central portion of the refinery. Discharge is from the basin to the No. 13 Separator. Groundwater monitoring is not currently being conducted at this site.
 - b. Lake Mead is an unlined catchment basin for storm water runoff from the central portion of the refinery. Discharge is to the No. 1A Separator. There is no information available regarding any historical use of this area for spill or waste containment. There is no groundwater monitoring being conducted at this site.
 - c. 10 sump is an unlined catchment basin which collects storm water runoff from the tank farm in the northern most area of the refinery. It is divided into two separate parts, 10A and 10B. 10A sump collects storm water within the bermed areas of the tank farm, while 10B sump collects storm water outside the bermed areas of this tank farm. There previously was potential for oily waste to collect in 10A sump. Tanks in the area have been taken out of service and only clean stormwater is currently routed to 10A sump. There is no information available regarding any historical use of these areas for spills or waste containment. There is no groundwater monitoring being conducted at this site.
 - d. 7 sump is an unlined drainage ditch which conducts water to the waste water treatment system. Sample results indicate the presence of a high pH waste material. There is no groundwater monitoring currently being conducted at this site.
 - e. Lake Rushing and Majka Ditch collect and conduct storm water from the eastern part of the refinery to the No. 2A separator. Majka Ditch contained asphalt-like material on the sides of the ditch which appeared to be a result of spills from the asphalt plant. There is no information regarding any historical use of

these areas for spills or waste containment. 300 cubic yards of contaminated soil were removed from the ditch in the fall of 1987. Soil sampling after removal of the waste indicated that in three out of nine samples, hazardous levels of lead or arsenic remained. There is no groundwater monitoring currently being conducted at this site.

9. The Toxic Pits Cleanup Act, hereinafter called the TPCA requires that all Class I surface impoundments sited within 1/2 mile upgradient from a potential source of drinking water cease discharge by June 30, 1988. The law also requires that all other Class I surface impoundments in the State be equipped with a double liner and a leachate collection and removal system by January 1, 1989. The law requires that all owners and operators of these surface impoundments submit a Hydrogeologic Assessment Report (HAR) to determine whether the surface impoundment is polluting or threatening to pollute waters of the State. The Hydrofluoric Acid Pits, as described above, is subject to the provisions of the TPCA.
10. The discharger submitted a HAR for the Hydrofluoric Acid Pits on August 5, 1987. The unit is currently being prepared for closure and no longer contains liquid hazardous waste or hazardous waste containing free liquids. As such it has met the cease discharge requirements of the TPCA.
11. Section 13273 of the Water Code requires the submittal of a Solid Waste Assessment Test Program, hereinafter called the SWAT, which is designed to establish whether there has been any leakage of hazardous waste from solid waste disposal facilities to the nearby soils, the vadose zone, or waters of the State. The Old City Dump and Landfill 15 described above are subject to Section 13273 of the Water Code.
12. A Report of Waste Discharge, as required by Article 9 of Subchapter 15, was submitted to Board staff on January 24, 1985. This report was filed for eight existing storm water catchment basins, which discharge to the waste water treatment ponds system, and which were not covered by Board Order No. 81-55. Although a great deal of hydrogeologic and other information has been generated at the refinery, a complete Report of Waste Discharge which addresses all of the active and inactive waste management units at the Refinery has never been requested or submitted.
13. The discharger submitted a Solid Waste Management Unit Questionnaire response to the EPA in 1985. This document stated that there were 14 inactive solid waste management units, 2 surface impoundments (not including the wastewater treatment pond system), 5 landfills, the wastewater treatment system including the oil/water separators and the treatment ponds, and 1 waste treatment unit. As required by the Hazardous Solid Waste Amendments (HSWA) to RCRA in 1984, the EPA conducted a preliminary file review to determine whether hazardous waste constituents may be released from any solid waste management unit at the site. This report listed all of the units identified by the discharger in the Solid Waste Management Unit Questionnaire plus other areas of potential concern. Many of these are subject to

State regulatory requirements (Porter-Cologne Water Quality Control Act, Subchapter 15, TPCA or SWAT) and are listed and described above. Other units are not subject to the provisions of Subchapter 15, or to the SWAT or TPCA programs. These units potentially contribute to groundwater pollution at the site and as such shall be investigated. These units are described below and illustrated in Figure 3.

- a. The Sulfur Recovery Unit Neutralization Pit is located west of the No. 1 Oxidation Pond. It is approximately 10 ft. by 6 ft. by 8 ft. deep and has a capacity of 3590 gallons of liquid. The pit receives sulfuric acid and sulfate purge from the sulfur recovery unit. The pH of this waste stream is monitored in the pit and the effluent is routed to the wastewater treatment system. In the past, the wastestream used to be neutralized in the pit. There is no information on the date of startup, the date of closure, any release controls, or any history of releases from the unit.
 - b. Tank Car Cleaning, Truck Wash, and Rail Car Loading areas exist throughout the refinery. These units involve washdown of rail cars, tanks, and trucks and therefore have the potential for washwater which may contain oily water pollutants to be discharged to ground.
 - c. Mud sump is a low area in the refinery which is used for storage of stormwater runoff. At times the sump contains water and has oil stains along the perimeter.
 - d. Heat Exchanger Bundle Cleaning Units were two in ground tanks previously used for temporary storage of heat exchanger bundle cleaning sludges originating from the accumulation of solids consisting of iron scale or coke on the shell or tube of the heat exchanger.
14. There are a number of additional waste management units or areas at the refinery that are not subject to the provisions of Subchapter 15 which may cause the threat of pollution or pollution of the groundwater. The threat of pollution from these units and areas should be investigated. These units or areas are described below and illustrated in Figure 3.
- a. Oil Water Separators, Nos. 1, 2, 13, 15, and CPI have been used throughout the refinery to treat continuous flows of oily process water. Separators 1A and 2A were constructed in 1987 and have replaced Separators 1, 2, and 15. The separators are operated so that oil is skimmed off the surface and returned to product tankage, solids are allowed to settle to the bottom and the effluent is routed through to the wastewater treatment system. Historically, the sludge, which is a hazardous waste, has been periodically removed from these units and treated in the landfarms.

No. 1 Separator was constructed in 1912 and has a volume of 2.3 million gallons. The walls are constructed of concrete and the

floor of brick.

No. 2 Separator was constructed in 1920 and has a volume of 560,000 gallons. The walls are constructed of concrete and the floor construction material is unknown.

No. 13 Separator was constructed in 1944 and has a volume of 960,000. The walls and floor are constructed of concrete.

No. 15 Separator was built in 1950 and has a volume of 150,000. The walls are constructed of concrete and the floor construction material is unknown.

CPI Separator was built in 1976 and has a volume of 60,000 gallons. The separator is constructed of steel.

Separators 1A and 2A are above grade and were built in 1987. The separators were constructed of concrete with steel reinforcing and have secondary containment of a high density polyethylene liner placed between the separator and the foundation.

There are no groundwater monitoring wells which were installed to specifically monitor potential releases from the separators. Refinery wells installed for other purposes may be used to monitor releases from the separators. Separators 1, 2, and 15 have been taken out of service. Closure plans have not been requested or submitted for these units.

- b. Refinery Tank Farms include approximately 1000 tanks located throughout the refinery. There is limited groundwater monitoring to assess potential releases from these tanks.
 - c. Isomax Plant, Alkane Plant, Ammonia Plant, Additive Plant
There has been documented soil and groundwater contamination within the vicinity of these plants. The plants have been identified as the source of the contamination.
15. All of the waste management units listed in this Order are subject to this Order.
16. Section 13227 of the Water Code requires the Board to review closure plans submitted pursuant to Section 25246 of the Health and Safety Code for hazardous waste facilities in order to assure adequate protection of water quality. The Board may condition its approval of these closure plans. Regulations contained in Title 22, California Code of Regulations which implement the Health and Safety Code, set a closure standard (Section 67211, Title 22) that includes minimization of migration of waste constituents to State waters. The Board finds that substantial compliance with the siting and construction standards contained in Subchapter 15 of Title 23 constitutes adequate minimization of waste migration for sites being closed.

17. The Board adopted a revised Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan) on December 17, 1986. This Order implements the water quality objectives stated in the Basin Plan.
18. The beneficial uses of San Pablo Bay in the vicinity of the site are:
 - a. Industrial service supply
 - b. Navigation
 - c. Contact and non-contact water recreation
 - d. Commercial and sport fishing
 - e. Wildlife and estuarine habitat
 - f. Preservation of rare and endangered species
 - g. Fish migration and spawning
 - h. Shellfish harvesting
19. The potential beneficial uses of groundwater underlying the site which is deeper than 100 feet are:
 - a. Industrial process water and service supply
 - b. Agricultural supply
 - c. Municipal and Domestic Supply

The shallow groundwater which is above 100 feet is discharged to the Bay.

20. The action to issue waste discharge requirements for continued operation of existing waste management units and for closure of waste management units is exempt from the California Environmental Quality Act (Public Resources Section 2100 et. seq.) in accordance with Section 15301 of the California Administrative Code.
21. The Board notified the discharger and interested agencies and persons of its intent to prescribe waste discharge requirements for the discharge and has provided them with an opportunity for a public hearing and an opportunity to submit their written views and recommendations.
22. The Board, in a public hearing held on March 16, 1988, heard and considered all comments pertaining to the discharge.

IT IS HEREBY ORDERED, that the discharger and any other persons that own the land or operate these units shall meet the applicable provisions contained in Division 7 of the California Water Code and regulations adopted thereunder and shall comply with the following (unless otherwise noted, any references to Sections and Articles refer to Subchapter 15 of Title 23):

A. Prohibitions

1. The discharge, storage, or treatment of waste, or materials which may impact the beneficial uses of the ground and surface water, shall not be allowed to create a condition of pollution or nuisance as defined in Sections 13050 (l) and (m), respectively, of the California Water Code.
2. Significant migration of pollutants through subsurface transport to waters of the State is prohibited.
3. There shall be no discharges of wastes to surface waters except as permitted under the National Pollutant Discharge Elimination System.

B. Specifications

The following specifications apply as set forth in the provisions.

1. General Specifications

- a. During waste disposal, handling, or treatment, no wastes shall be placed in a position where they can be carried into waters of the State.
- b. The containment structures for the units shall have a foundation or base capable of providing support for the structures and capable of withstanding hydraulic pressure gradients to prevent failure due to settlement, compression, or uplift.
- c. The units shall be operated to ensure that wastes will be a minimum of 5 feet above the highest anticipated elevation of underlying groundwater.
- d. The units shall prevent migration of wastes to adjacent geologic materials, groundwater, or surface water, throughout the operation, closure, and post-closure periods.
- e. The containment structures shall be designed by, and constructed directly under the supervision of and certified by, a registered civil engineer or a certified engineering geologist. The discharger shall receive written approval of the construction by the Executive Officer before use of the facility commences.
- f. The materials used for containment structures shall have appropriate chemical and physical properties to ensure

containment of wastes at all times. Liner permeabilities shall be determined relative to the fluids, including waste and leachate, to be contained. Permeabilities specified for final cover shall be relative to water. Liner permeabilities shall be determined by appropriate field test methods in accordance with accepted civil engineering practice.

- g. Earthen materials used in containment structures shall meet the specifications given in Section 2541 (d) of Subchapter 15.
- h. The units shall be designed to withstand the maximum credible earthquake without damage to the foundation or to the structures which control leachate, surface drainage, erosion, or gas.
- i. The integrity of containment structures shall be maintained at all times.

2. Class I Siting Specifications

- a. Class I disposal units shall be located where natural geologic features provide optimum conditions for isolation of wastes from waters of the State.
- b. Class I disposal units shall be immediately underlain by natural geologic materials which have a permeability (primary and secondary) of not more than 1×10^{-7} cm/sec, and which are of sufficient thickness to prevent vertical movement of fluid, including waste and leachate, from the unit to waters of the state for as long as the wastes pose a threat to water quality.
- c. Class I disposal units shall have natural or artificial barriers to be used to prevent lateral movement of waste, leachate, and fluids.
- d. Class I disposal units, other than land treatment units, shall be located outside of floodplains subject to inundation by floods with a 100-year return period, unless such units are designed, constructed, operated, and maintained to prevent inundation or washout due to floods of the 100 year return period.
- e. Class I disposal units, other than land treatment units, shall have a 200-foot set back from any known Holocene fault. Existing II-1 and treatment and storage units may be located within 200 feet of a known Holocene fault, provided that containment structures are capable of withstanding ground accelerations associated with the maximum credible earthquake.
- f. Class I disposal units, other than land treatment units, shall be located outside areas of potential rapid geologic change, unless containment structures are designed, constructed,

operated, and maintained to preclude failure, as a result of such changes.

- g. Class I disposal units shall be located outside areas subject to tsunamis, seiches, and surges, unless they are designed, constructed, operated, and maintained to preclude failure due to such events.

3. Class I Construction Specifications

- a. Class I waste management units shall comply with Construction Standards pursuant to Article 4, Subchapter 15.
- b. Class I landfills must have a liner. A clay liner, a minimum of 2 feet thick shall be installed at a relative compaction of at least 90 percent. A synthetic liner shall be at least 40 mils where used in combination with a clay liner. Liners shall cover all natural geologic material at the waste management unit likely to come into contact with waste or leachate.
- c. Class I landfill shall install a leachate collection and removal system. The system shall be installed directly above underlying containment features for landfills, or between the inner and outer liner. It shall be designed, constructed, maintained, and operated to collect twice the maximum anticipated daily volume of leachate from the waste management unit.
- d. Class I disposal units shall be fitted with cutoff walls meeting the specifications contained in Section 2545(b) of Subchapter 15. These cutoff walls shall be used in conjunction with natural geologic material to prevent lateral movement of fluid, including waste and leachate.
- e. Class I disposal units shall have precipitation and drainage control facilities meeting the applicable specifications contained in Section 2546 of Subchapter 15. These facilities shall be designed and operated to accommodate the probable maximum precipitation.

4. General Closure Specifications

- a. Closure of all waste management units shall be in compliance with the requirements of Article 8.
- b. Classified waste management units shall be closed according to an approved closure and post-closure maintenance plan which provides for continued compliance with the applicable standards for waste containment and precipitation and drainage controls in Article 4 of Subchapter 15 and the monitoring program requirements in Article 5 of Subchapter 15.

- c. The post closure maintenance period shall extend as long as the wastes pose a threat to water quality.
- d. Closure shall be under the direct supervision of a registered civil engineer or a certified engineering geologist.
- e. Closed waste management units shall be provided with at least two permanent monuments installed by a licensed land surveyor or a registered civil engineer, from which the location and elevation of wastes, containment structures, and monitoring facilities can be determined throughout the post-closure maintenance period.
- f. Vegetation for closed waste management units shall be selected to require minimum irrigation and maintenance, and shall not impair the integrity of containment structures including the final cover.

5. Landfill Closure Specifications

- a. Closed landfills shall be provided with not less than two feet of appropriate materials as a foundation layer for the final cover. The foundation layer shall be compacted to the maximum density obtainable at optimum moisture content using methods that are in accordance with accepted civil engineering practice.
- b. Closed landfills shall be provided with not less than one foot of soil containing no waste or leachate, placed on top of the foundation layer equal to permeability of any bottom liner system, underlying natural geologic materials or 1×10^{-6} cm/sec, whichever is less.
- c. Closed landfills shall be provided with not less than one foot of soil containing no waste or leachate, placed on top of the material described in Specification 5.b; the rooting depth of any vegetation planted on the cover shall not exceed the depth to the material in Specification 5.b.
- d. Closed landfills shall be graded and maintained to prevent ponding and to provide slopes of at least three percent. Lesser slopes may be allowed if any effective system is provided for diverting surface drainage from covered wastes. Areas with slopes greater than 10 percent, surface drainage courses, and areas subject to erosion by water and wind shall be protected or designed and constructed to prevent such erosion.
- e. Throughout the post-closure maintenance period, the discharger shall maintain the structural integrity and effectiveness of all containment structures, and maintain the final cover as necessary to correct the effects of settlement or other adverse factors; continue to operate the leachate

collection and removal system as long as leachate is generated and detected; maintain monitoring systems and monitor the groundwater, surface water, and the unsaturated zone in accordance with applicable requirements of Article 5 of this subchapter, prevent erosion and related damage of the final cover due to drainage and protect and maintain surveyed monuments.

6. Surface Impoundment Closure Specifications

- a. For Class II surface impoundments, all free liquid remaining in a surface impoundment at the time of closure shall be removed and discharged at an approved waste management unit. All residual solids shall be treated to eliminate free liquid.
- b. For Class II surface impoundments, following the removal and treatment of liquid waste, the impoundment shall be closed in one of two ways, as approved by the Board:
 1. All residual wastes, including sludges, precipitates, settled solids, and liner materials contaminated by wastes, shall be completely removed from the impoundment and discharged to an approved waste management unit. Remaining containment features shall be inspected for contamination and, if not contaminated, may be dismantled. Any natural geologic materials beneath or adjacent to the closed surface impoundment that have been contaminated shall be removed for disposal at an appropriate waste management unit. If, after reasonable attempts to remove such contaminated materials, the discharger demonstrates that removal of all remaining contamination is infeasible, the waste management unit shall be closed as a landfill pursuant to Section 2581 of Article 8.
 2. All residual wastes, including sludges, precipitates, settled solids, and liner materials, shall be compacted, and the waste management unit shall be closed as a landfill pursuant to Section 2581 of Article 8, provided that the closed waste management unit meets applicable standards for landfill waste management units in Articles 3 and 4. The moisture content of the residual wastes, including sludges, shall not exceed the moisture-holding capacity of the waste either before or after closure. Surface impoundments which contain only decomposable wastes at closure may be closed as land treatment facilities according to Section 2584 of Article 8.
- c. For Class I surface impoundments remove all liquid wastes. Following removal and proper disposal of liquid wastes, all residual wastes and contaminated liners and soils shall be removed or it shall be demonstrated by the discharger that removal is not feasible. If wastes, contaminated liners or

soils, are left in place the surface impoundment shall be closed in a manner that minimizes the potential for migration of waste constituents, their degradation products, or leachate to State waters. Compliance with Articles 3 and 4 of Subchapter 15 to the extent feasible and necessary shall be deemed adequate containment for minimization of potential migration. Engineered alternatives that provide equivalent protection of water quality may be used as substitutes for requirements contained in Articles 3 and 4.

7. Land Treatment Facility Closure Specifications

- a. During the closure and post-closure period, the discharger shall: continue all operations necessary to maximize the degradation, transformation, or immobilization of waste constituents within the treatment zone; continue all groundwater and unsaturated monitoring in compliance with Article 5; continue all operations in the treatment zone to prevent runoff of waste constituents; and maintain the precipitation and drainage control system.

8. Groundwater Monitoring Specifications

- a. A groundwater quality monitoring program which is capable of detecting leaks from waste management units into waters of the state, during the active life, the closure and post-closure monitoring periods shall be implemented. This program shall comply with all applicable sections of Article 5.
- b. Water quality protection standards will be established by the Board according to the conditions outlined in Section 2552. These standards shall be generated upon submittal of an approved groundwater quality monitoring program and based upon one year of background groundwater quality monitoring data collected at each waste management unit.
- c. Points of compliance will be established by the Board according to Section 2553 upon submittal of an approved groundwater quality monitoring program.
- d. The compliance period for groundwater monitoring shall extend until the waste no longer poses a threat to water quality.
- e. The design and construction of the groundwater monitoring system shall comply with the specifications outlined in Section 2555(b) through (d) of Article 5.
- f. The groundwater sampling and analysis program shall ensure that groundwater quality data are representative of the groundwater in the area of the waste management unit and comply with Section 2555 (e) through (g) of Article 5.

- g. Statistical procedures as outlined in Section 2555 h shall be used to determine whether the water quality protection standards have been exceeded at any unit.
 - h. A detection monitoring program, as required in Section 2556, shall be implemented at each waste management unit, or group of contiguous waste management units, except at the land treatment units, the Hydrofluoric Acid Pits/Alkane Plant area, Pollard Pond, and any other area of the refinery where the discharger suspects that water quality impairment has occurred.
 - i. A verification monitoring program, as required in Section 2556 and 2557, shall be implemented at the land treatment units, the Hydrofluoric Acid Pits/Alkane Plant Area, Pollard Pond, any other area of the refinery where the discharger suspects that water quality impairment has occurred, or upon determination that a statistically significant increase in indicator parameters or waste constituents has occurred during detection monitoring at a waste management unit or group of units.
 - j. A corrective action program, as required in Section 2557 and 2558, shall be implemented upon completion of the verification monitoring program.
 - k. Unsaturated zone monitoring, as required in Section 2559, shall be conducted where feasible.
9. Specifications for Exemptions to the Requirements of Subchapter 15
- a. The discharger may request the Board to grant exemptions to the construction or prescriptive standards of Subchapter 15 if both the following conditions are met: (1) the construction or prescriptive standard is not feasible because it is unreasonably burdensome and will cost substantially more than alternatives, or is impractical and will not promote attainment of applicable performance standards; and (2) there is a specific engineered alternative that is consistent with the performance goal addressed by the particular construction or prescriptive standards, and affords equivalent protection against water quality impairment.

10. Specifications for Inactive Waste Management Units

- a. A groundwater monitoring program must be developed and implemented at each inactive waste management unit in accordance with Article 5.
- b. A corrective action program must be developed and implemented at each inactive waste management unit. The corrective action program shall take into account the results of the groundwater monitoring program for the site. If the corrective action program proposes to leave wastes in place, the program shall implement the applicable closure provisions of Subchapter 15 to the extent feasible and necessary. For corrective action at surface impoundments that contain hazardous wastes where the corrective action program proposes to leave the wastes in place, the program shall implement Specification B.6.c

C. Provisions

1. The discharger shall comply with Prohibitions A.1 through A.3 immediately upon adoption of this Order.
2. The discharger shall submit a refinery wide Report of Waste Discharge in accordance with Article 9 of Subchapter 15 to the extent outlined in Appendix 1. The Report of Waste Discharge shall include information on refinery wide climatologic, geologic, and hydrologic characteristics.
REPORT DUE: September 1, 1988
3. The discharger shall comply with Specification B.8 and Article 5 according to the following tasks and time schedule:
 - a. Submit a proposal for a general groundwater monitoring program which includes all of the information outlined in Appendix 3.
REPORT DUE: June 1, 1988
 - b. Submit an investigation sampling plan and a quality assurance/quality control plan which includes all of the information outlined in Appendix 4.
REPORT DUE: June 1, 1988
 - c. Submit a report which includes the results from analyses of one round of samples collected from wells included in the general groundwater monitoring program.
REPORT DUE: September 1, 1988
 - d. Achieve full compliance according to the groundwater monitoring plan as approved by the Executive Officer
COMPLIANCE DATE: July 1, 1989
 - e. If it is determined by the Executive Officer, based on information generated from Provision 3.d, that water quality impairment has occurred, and that this water quality impairment has not originated from a waste management unit that is cited in this Order, the discharger shall submit a groundwater corrective action plan.
REPORT DUE: according to a date specified by the Executive Officer
4. Waste Water Treatment Ponds

The discharger shall comply with Specification B.8 according to the following tasks and time schedule:

 - a. Submit a site specific groundwater monitoring plan in accordance with Specification B.8 and Article 5. Information to be contained in the plan is outlined in Appendix 5.
REPORT DUE: December 1, 1989

- b. Achieve full compliance with Specification B.8 according to the groundwater monitoring plan as approved by the Executive Officer.

COMPLIANCE DATE: June 1, 1991

- c. Submit a proposal that will outline the steps necessary to complete a site specific Report of Waste Discharge. The Report of Waste Discharge shall outline how the waste water treatment ponds will comply with the design, operation, construction, and siting requirements of Subchapter 15. The proposal for the site specific Report of Waste Discharge shall include the information outlined in Appendix 2 and Section 2596.

REPORT DUE: January 1, 1989

- d. Submit the site specific report of waste discharge.

REPORT DUE: September 1, 1989

5. The Landfarms

The discharger shall comply with Specifications B.4, B.5, B.7 and B.8 in accordance with the following tasks and time schedule:

- a. Submit a proposal for a groundwater monitoring program for the landfarms according to Specification B.8 and Article 5. The proposal shall include all of the information outlined in Appendix 5.

REPORT DUE: April 1, 1988

- b. Achieve full compliance with Specification B.8 according to the groundwater monitoring as approved by the Executive Officer.

COMPLIANCE DATE: July 1, 1989

- c. Submit a reconnaissance survey plan for the landfarms which outlines the steps that will be taken to: 1) characterize the soils at the landfarms including, at a minimum, a description (with supporting data) of the mineralogy, texture, soil profile, depth of soil horizons, erodability, and depth of seasonal water table, and 2) characterize the lateral and vertical extent of hazardous waste constituents in the soil through collection of an adequate number of soil core and soil pore liquid samples. The number, location, and depth of samples, the parameters for which the samples will be analyzed, rationale for the proposed program and a QA/QC program shall be included in the proposal.

REPORT DUE: April 1, 1988

- d. Submit a proposal which outlines all the steps that will be taken to collect the data necessary to comply with Specification B.7 of this Order. This proposal shall describe: 1) how biodegradation, transformation or immobilization of the wastes in the treatment zone will be maintained and/or enhanced; 2) how runoff, wind dispersal, and precipitation and drainage controls will be maintained; 3) how the reduction of

hazardous waste constituents in the treatment zone and zone of incorporation will be measured. The proposal shall include: 1) a schedule for future maintenance and biodegradation activities including tilling, and the addition of moisture, nutrients, and/or microbes; 2) the steps that will be taken to chemically analyze the treatment zone and zone of incorporation to determine the remaining hazardous waste constituents in the soils and soil pore liquids; and 3) to measure the moisture content, nutrient content, and microbial population in the soil. The proposal shall outline the number, location, depth of samples to be collected, frequency of sampling, parameters for which the soil and soil pore liquid will be analyzed, rationale for the proposed program and a QA/QC plan.
REPORT DUE: April 1, 1988

- e. Achieve full compliance with Specification B.7 according to reconnaissance survey, and biodegradation activities programs as approved by the Executive Officer.
IMPLEMENTATION DATE: Thirty days after approval of Executive Officer
- f. Submit a closure and post-closure monitoring and maintenance plan according to Specifications B.4, B.5, B.7, Article 8 and Section 2597. The report shall include the steps that will be taken and a time schedule necessary to close the waste management unit. The report shall outline how it will be determined when treatment is no longer occurring at the unit. When biodegradation at the unit cannot reduce the concentration of the waste constituents any further, the unit will be closed as a landfill according to Specifications B.4 and B.5. The plan shall be capable of demonstrating compliance with the specifications for this unit.
REPORT DUE: July 1, 1988
- g. Achieve full compliance with Specifications B.4, B.5 and B.7 according to the closure and post-closure monitoring and maintenance plan as approved by the Executive Officer.
- h. Submit a groundwater corrective action proposal for the landfarms. The proposal shall include a detailed discussion of at least three clean-up strategies and the estimated cost and consequences of each one. The alternatives must range from removal of all waste constituents to no action.
REPORT DUE: July 1, 1989

6. Hydrofluoric Acid Pits, Pond 13A, Schaefer Slough

The discharger shall comply with Specifications B.4, B.6, and B.8 according to the following tasks and time schedule:

- a. Submit a site specific groundwater monitoring plan in accordance with Specification B.8 and Article 5. Information to be contained in the plan is outlined in Appendix 5.
REPORT DUE: April 1, 1988

- b. Achieve full compliance with Specification B.8 according to the groundwater monitoring plan as approved by the Executive Officer.

COMPLIANCE DATE: July 1, 1989

- c. Submit a closure and post-closure monitoring and maintenance plan in accordance with Specification B.4 and B.6, Article 8, and Section 2597 for the Hydropits/Schaefer Slough area. The plan shall be capable of demonstrating compliance with the specifications for this unit.

REPORT DUE: April 1, 1988

- d. Achieve full compliance with Specifications B.4 and B.6 according to the closure and post-closure monitoring and maintenance plan as approved by the Executive Officer.

COMPLIANCE DATE: July 1, 1989

- e. Submit a groundwater corrective action proposal for the Hydropit/Schaefer slough/ Pond 13A area. The proposal shall include a detailed discussion of at least three clean-up strategies and the estimated cost and consequences of each one. The alternatives must range from removal of all waste constituents to no action.

REPORT DUE: January 1, 1989

7. Pollard Pond

The discharger shall comply with Specifications B.8 and B.10 according to the following tasks and time schedule:

- a. Submit a site specific groundwater monitoring plan in accordance with Specification B.8 and Article 5. Information to be contained in the plan is outlined in Appendix 5.

REPORT DUE: June 1, 1988

- b. Achieve full compliance with Specification B.8 according to the groundwater monitoring plan as approved by the Executive Officer.

COMPLIANCE DATE: July 1, 1989

- c. Submit a recycling plan for the waste materials or a schedule for submitting a closure and post-closure monitoring and maintenance plan in accordance with B.10.

REPORT DUE: May 1, 1988

- d. Achieve full compliance with Specification B.10 according to the recycling or closure plan as approved by the Executive Officer.

REPORT DUE: January 1, 1989

8. Landfill 15
Old City Dump
Phthalic Anhydride Site
Gertrude Street/Bonner Brothers Site
Pond 11
Pond 14
Big Wheels Site

The Discharger shall comply with Specifications B.8 and B.10 according to the following tasks and the time schedule found in Appendix 6.

- a. Submit a proposed workplan of activities that will be undertaken to complete a site specific report of waste discharge. The site specific report of waste discharge shall include the information outlined in Appendix 2.
- b. Submit the site specific report of waste discharge according to the workplan as approved by the Executive Officer.
- c. Submit a site specific groundwater monitoring plan in accordance with Specification B.8 and Article 5. Information to be contained in the plan is outlined in Appendix 5.
- d. Achieve full compliance with Specification B.8 according to the groundwater monitoring plan as approved by the Executive Officer.
- e. Submit a corrective action proposal in accordance with Specification B.10. At the discretion of the Executive Officer, this plan shall include a detailed discussion and the cost and consequences of the following corrective action strategies: 1) clean closure of the site; 2) full compliance with Subchapter 15 regulations; 3) engineered alternatives that are consistent with the closure and corrective action requirements of Subchapter 15; 4) recycle alternatives; 5) treatment methods for residual waste constituents; and 6) no action.
- f. Achieve full compliance with Specification B.10 according to the corrective action plan as approved by the Executive Officer.

9. Landfill 15 and Old City Dump

- a. Submit a proposal for a SWAT report for Landfill 15 and the Old City Dump which complies with Water Code Section 13273 and which follows the outline of the guidance document developed by the State Water Resources Control Board pursuant to Section 13273.
REPORT DUE: December 1, 1988
- b. Submit the SWAT report according to the proposal approved by the Executive Officer.
REPORT DUE: July 1, 1989

10. Isomax Cooling Tower
Alkane Plant
Ammonia Plant
Additive Plant

The discharger shall implement a groundwater monitoring program according to the following tasks and time schedule:

- a. Submit a proposal to monitor existing wells as part of the required refinery wide groundwater monitoring program as required in Provision 3.c. The proposal shall include information outlined in Appendix 3.
REPORT DUE: June 1, 1988
- b. Submit a report which includes the results from analyses of one round of samples collected from the existing wells.
REPORT DUE: September 1, 1988
- c. Submit a status report of past and ongoing activities at each of the plant sites. This status report should include a description of all information pertinent to past groundwater monitoring and any corrective action work that has been performed at each site.
REPORT DUE: January 1, 1989
- d. Achieve full compliance according to the groundwater monitoring plan as approved by the Executive Officer.
COMPLIANCE DATE: July 1, 1989
- e. If it is determined by the Executive Officer based on the information generated for Provision 10.b that waste constituents have been or are being released to groundwater from any of these units, the discharger shall define the extent of the waste constituents in the soil and groundwater and submit a proposal for groundwater corrective action. The proposal shall include a detailed discussion of at least three clean-up strategies and the estimated cost and consequences of each one. The alternatives must range from removal of all waste constituents to no action. Additionally, the discharger shall submit plans to prevent future releases from the unit(s).
REPORT DUE: 9 months after determination

11. Pond 13
Landfill under Isomax Plant and Landfarm #1
Old Drum Storage Facility

The discharger shall comply with Specification B.8 according to the following tasks and time schedules:

- a. Submit a site specific groundwater monitoring plan in accordance with Specification B.8 and Article 5. Information to be contained in the plan is outlined in Appendix 5.
REPORT DUE: See Appendix 6

- b. Achieve full compliance with Specification B.8 according to the groundwater monitoring plan as approved by the Executive Officer.

COMPLIANCE DATE: See Appendix 6

- c. If it is determined by the Executive Officer based on the information generated for Provision 11.b that waste constituents have been or are being released to groundwater from any of these units, the discharger shall define the extent of the waste constituents in the soil and groundwater and submit a proposal for groundwater corrective action. The proposal shall include a detailed discussion of at least three clean-up strategies and the estimated cost and consequences of each one. The alternatives must range from removal of all waste constituents to no action. Additionally, the discharger shall submit plans to prevent future releases from the unit(s).
REPORT DUE: 9 months after determination

12. Landfill under Landfarms 2 and 3
TEL site

The discharger shall comply with Specification B.8 according to the following tasks and time schedules:

- a. Submit a proposal to monitor existing wells as part of the required refinery wide groundwater monitoring program as required in Provision 3.c. The proposal shall include information outlined in Appendix 3.
REPORT DUE: June 1, 1988
- b. Submit a report which includes the results from analyses of one round of samples collected from the existing wells.
REPORT DUE: September 1, 1988
- c. Achieve full compliance according to the groundwater monitoring plan as approved by the Executive Officer.
COMPLIANCE DATE: July 1, 1989
- d. If it is determined by the Executive Officer, based on information generated from Provision 12.c, that waste constituents have been or are being released to groundwater from any of these units, the discharger shall define the extent of the waste constituents in the soil and groundwater and submit a proposal for groundwater corrective action. The proposal shall include a detailed discussion of at least three clean-up strategies and the estimated cost and consequences of each one. The alternatives must range from removal of all waste constituents to no action. Additionally, the discharger shall submit plans to prevent future releases from the unit(s).
REPORT DUE: 9 months after determination

13. Impound Basins

The discharger shall comply with Prohibition A.1 according to the following tasks and time schedule found in Appendix 6.

- a. Submit a proposal for a soil sampling program which will identify the concentration of waste constituents in the soils in the impound basins.
- b. Submit the report which determines the existence of waste constituents in the soils in the impound basins.
- c. If waste constituents are found to exist at designated or hazardous levels, at the discretion of the Executive Officer, a proposal which outlines a site specific report of waste discharge and a site specific groundwater monitoring plan that will be implemented at each basin shall be submitted.
Report Date: 9 months after determination

14. The No. 1, 2, 13, and 15 Separators

The discharger shall comply with Prohibition A.1 according to the following tasks and time schedule found in Appendix 6.

- a. Submit a proposal for a site investigation to determine whether there are any discharges of waste constituents from the units to the groundwater.
- b. Submit a closure plan for each of the separators no longer in service as required by the Executive Officer.
- c. Submit the site investigation report in accordance with the proposal submitted for 14.a as approved by the Executive Officer.
- d. If it is determined by the Executive Officer based on the information generated for Provision 13.c that waste constituents have been or are being released to groundwater from any of these units, the discharger shall define the extent of the waste constituents in the soil and groundwater and submit a proposal for groundwater corrective action. The proposal shall include a detailed discussion of at least three clean-up strategies and the estimated cost and consequences of each one. The alternatives must range from removal of all waste constituents to no action. Additionally, the discharger shall submit plans to prevent future releases from the unit(s).
REPORT DUE: 9 months after the investigation

15. The Tank Farms

The discharger shall comply with Prohibition A.1 according to the following tasks and time schedule found in Appendix 6.

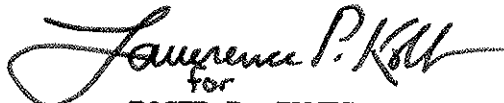
- a. Submit a proposal for a site investigation to determine whether there are any discharges of waste constituents from the units to the groundwater.
 - b. Submit the site investigation report in accordance with the proposal submitted for provision 15.a as approved by the Executive Officer.
 - c. If it is determined by the Executive Officer based on the information generated for Provision 14.b that waste constituents have been or are being released to groundwater from any of these units, the discharger shall define the extent of the waste constituents in the soil and groundwater and submit a proposal for groundwater corrective action. The proposal shall include a detailed discussion of at least three clean-up strategies and the estimated cost and consequences of each one. The alternatives must range from removal of all waste constituents to no action. Additionally, the discharger shall submit plans to prevent future releases from the unit(s).
REPORT DUE: 9 months after the determination
16. The Sulfur Recovery Unit Neutralization Pit; the Tank Car Cleaning, Rail Car Loading and Truck Washing Areas; the Heat Exchanger Bundle Cleaning Unit; the CPI Separator; and the Mud Sump shall comply with Prohibition A.1 according to the following tasks and time schedule:
- a. Submit a proposal and time schedule for a site investigation to determine whether there are any discharges of waste constituents from the units to groundwater.
REPORT DUE: See Appendix 6
 - b. Submit the site investigation report in accordance with the proposal and time schedule submitted for Provision 16.a as approved by the Executive Officer.
REPORT DUE: See Appendix 6
 - c. If it is determined based on the information generated for Provision 15.a, that waste constituents are being released to groundwater from any of these units, the discharger shall define the extent of the waste constituents in the soil and groundwater and submit a proposal for corrective action. The proposal shall include a detailed discussion of at least three clean-up strategies and the estimated cost and consequences of each one. The alternatives must range from removal of all waste constituents to no action. Additionally, the discharger shall submit plans to prevent future releases from the unit(s).
REPORT DUE: 9 months after the determination.
17. If the Discharger is delayed, interrupted or prevented from meeting one or more of the completion dates specified in this Order, the discharger shall promptly notify the Executive Officer.

18. All soil and groundwater and soil samples shall be analyzed by State certified laboratories, or laboratories accepted by the Executive Officer using approved EPA methods for the type of analyses to be performed. All laboratories shall maintain quality assurance/quality control records for the Board staff review.
19. The discharger shall maintain in good working order, and operate, as efficiently as possible, any facility or control system installed to achieve compliance with the requirements of this Order.
20. The discharger shall permit the Board, or its authorized representative, in accordance with Section 13267(c) of the California Water Code:
 - a. Entry upon premises in which any pollution sources exist, or may potentially exist, or in which any required records are kept, which may be relevant to the Order.
 - b. Access to copy any records required to be kept under the terms and conditions of this Order.
 - c. Inspection of any monitoring equipment of methodology implemented in response to this Order.
 - d. Sampling of any groundwater or soil which is accessible, or may become accessible, as part of any investigation or remedial action program undertaken by the Discharger.
21. The discharger shall remove and relocate any wastes which are discharged at this site in violation of these requirements.
22. The discharger shall file with this Board a report of any material change or proposed change in the character, location, or quantity of this waste discharge. For the purpose of these requirements, this includes any proposed change in the boundaries, contours, or ownership of the disposal areas.
23. The discharger shall notify the Board if during any subsurface investigations conducted on the refinery property soil contamination is identified which may potentially have an adverse impact on ground or surface waters.
24. If the discharger has commenced work under a program or plan approved by the Executive Officer and is in compliance with the schedule of work under that program or plan, then the discharger shall be deemed to be in full compliance with the program or plan even though all of the work or tasks to ultimately be performed have not been completed.
25. This discharger shall maintain a copy of this Order at this site so as to be available at all times to site operating personnel.
26. The Board considers the property owner and site operator to have a continuing responsibility for correcting any problems within their reasonable control which arise in the future as a result of this waste discharge or water applied to this property during subsequent use of

the land for other purposes.

27. These requirements do not authorize the commission of any act causing injury to the property of another or of the public, do not convey any property rights, do not remove liability under federal, state or local laws, and do not authorize the discharge of waste without the appropriate federal, state, or local permits, authorizations, or determinations.
28. If the discharger is delayed, interrupted or prevented from meeting one or more of the time schedules in this Order due to circumstances beyond their reasonable control, the discharger shall promptly notify the Executive Officer. In the event of such delays, the Board will consider modification of the time schedules established in this Order.
29. This Order supercedes Order Nos. 81-55 and 83-31. Order Nos. 81-55 and 83-31 are hereby rescinded.

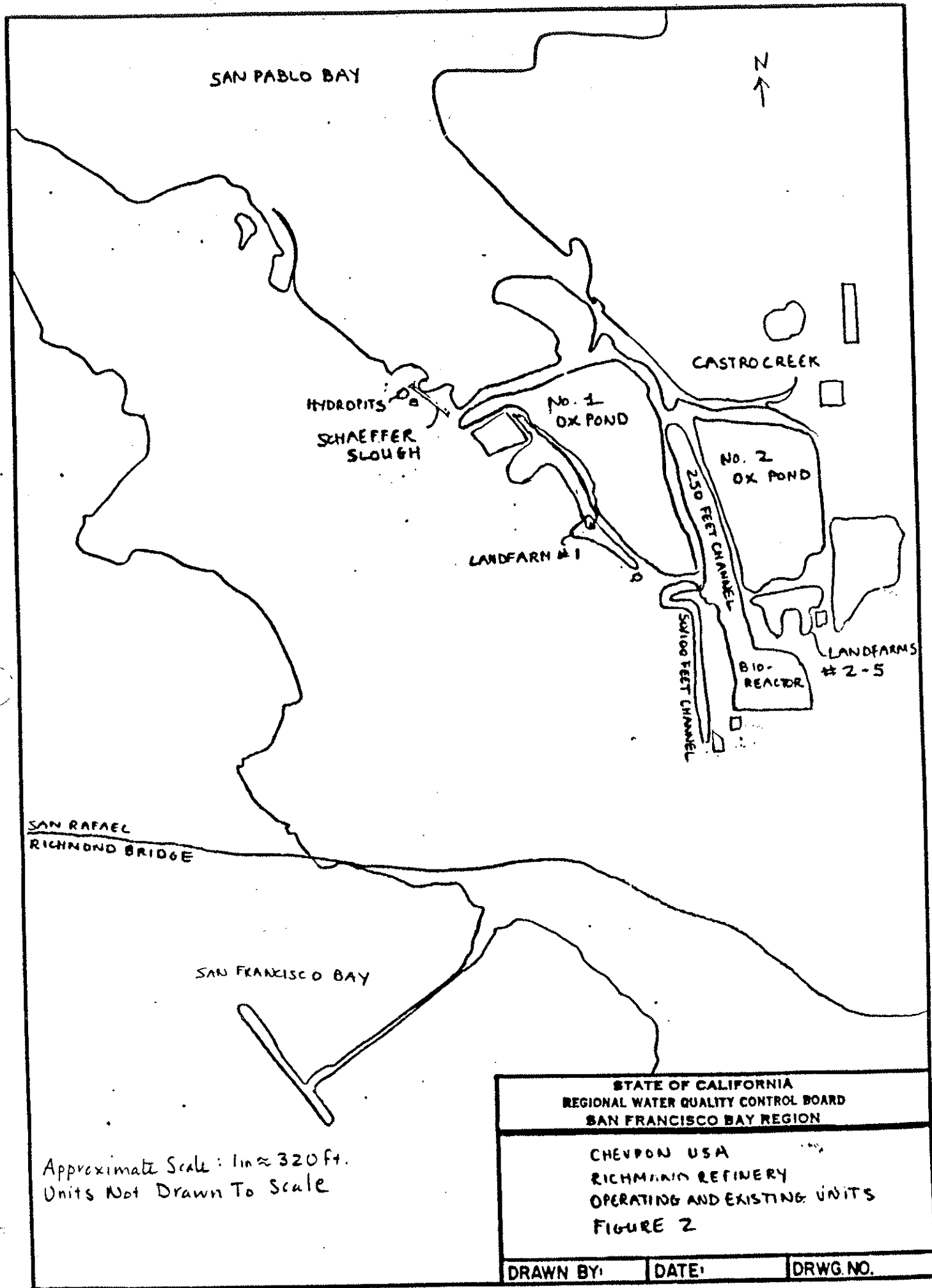
I, Roger B. James, Executive Officer, do hereby certify the foregoing is a full, true and correct copy of an Order of the California Regional Water Quality Control Board, San Francisco Bay Region, on March 16, 1988.

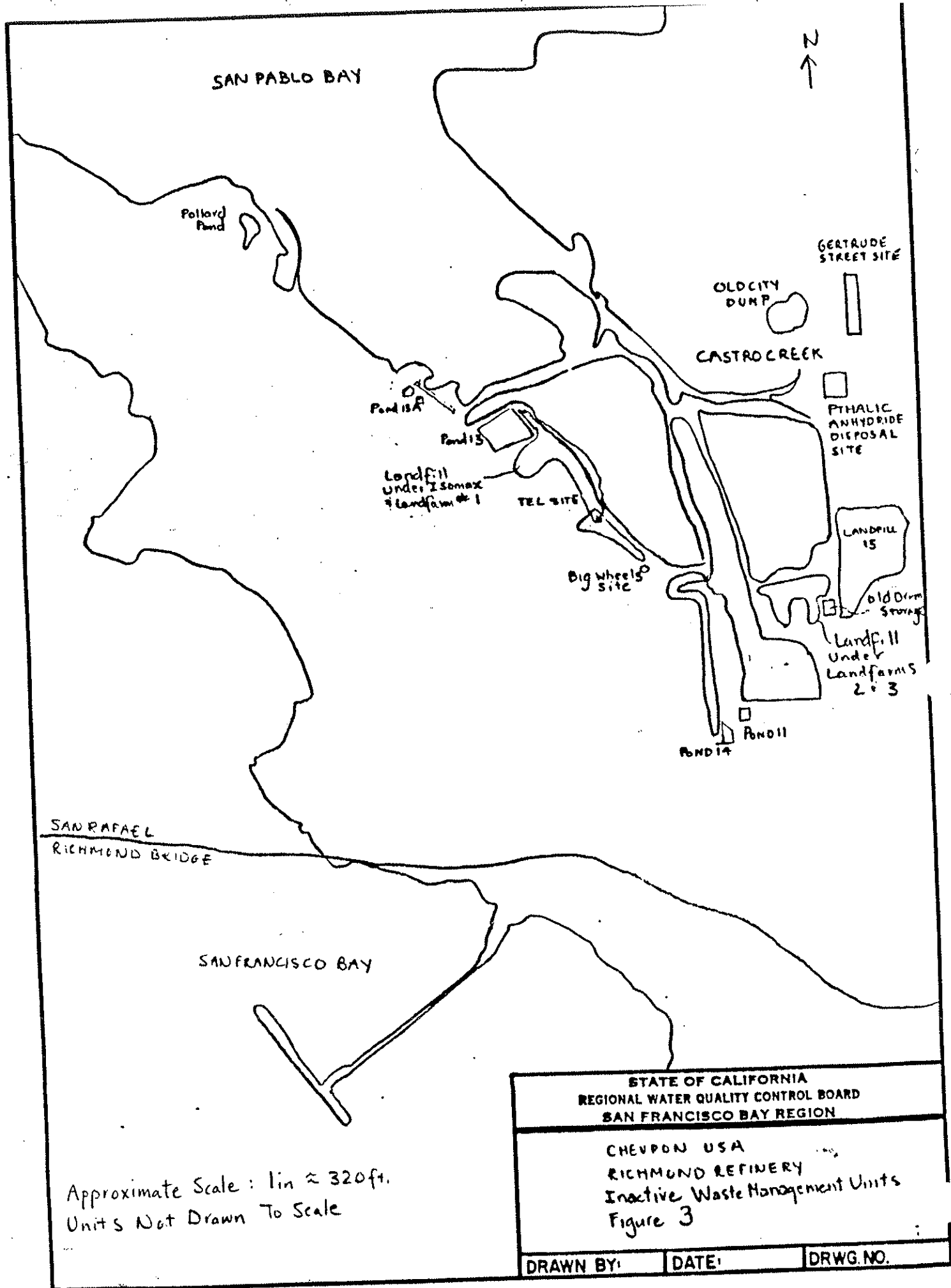

for
ROGER B. JAMES
Executive Officer

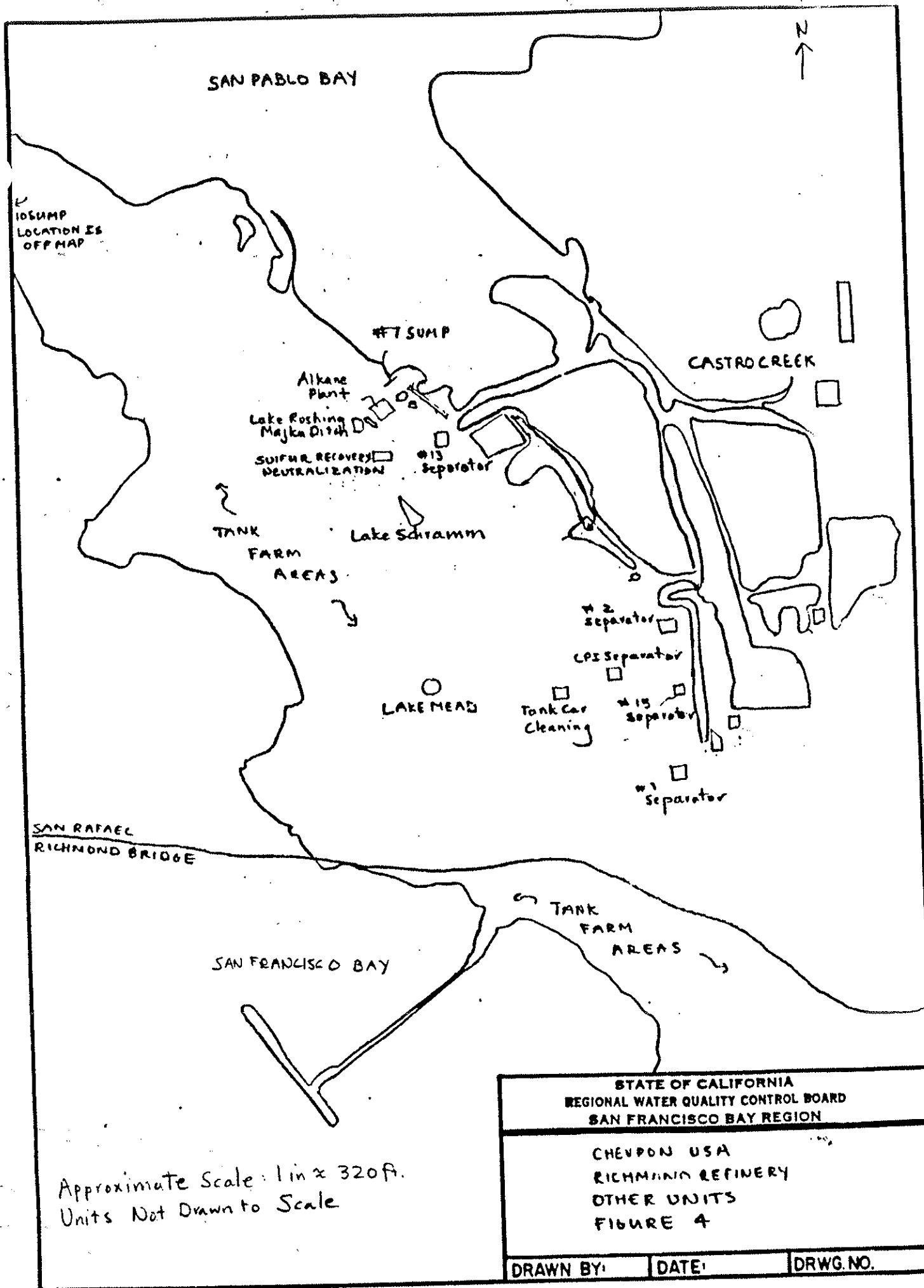
Attachments:

- Figure 1- Site Map
- Figure 2- Operating and existing waste management units
- Figure 3- Inactive waste management units
- Figure 4- RCRA Facility Investigation and Miscellaneous Units

- Appendix 1- Outline of Refinery Wide Report of Waste Discharge
- Appendix 2- Outline of Site Specific Report of Waste Discharge
- Appendix 3- Outline of Refinery Wide Groundwater Monitoring Plan
- Appendix 4- Outline of General Site Sampling Plan
- Appendix 5- Outline of Site Specific Groundwater Monitoring Plan
- Appendix 6- Time Schedule for Compliance with Waste Discharge Requirements







Appendix 1
Outline of Refinery Wide Report of Waste Discharge

A refinery wide report of waste discharge shall include the following:

- | | |
|--|---|
| 1. Refinery wide topographic map | 2595d(1) |
| 2. Refinery wide floodplain map | 2595d(2) |
| 3. Refinery wide climatology information | 2595e |
| 4. Refinery wide Geologic Information
Geologic Maps, Cross sections, Descriptions | 2595f(1), (2), (3) |
| 5. Seismic Information and Geologic Setting | 2595f(6) and
information to
satisfy
2531, 2532, 2533 |
| 6. Refinery wide hydrologic information | 2595g(1), (3), (4),
(5), (6) |
| 7. Refinery wide land and water use information | 2595(h) |
-

Appendix 2
Outline of Site Specific Report of Waste Discharge

For each unit the following information shall be submitted:

- | | |
|--|--|
| 1. Waste Characteristics | 2594, 2595 and
information to
satisfy Article 2 |
| 2. Unit specific topographic map | 2595d(1) |
| 3. Unit specific 100-year floodplain effects | 2595d(2a) (2b) |
| 4. Unit specific runoff-runoff effects | 2595e(5), and
information to
satisfy 2546. |
| 5. Unit specific geologic cross-sections,
description, testing, and seismic | 2595f |
| 6. Unit specific hydrology | 2595g(2) |
| 7. Unit specific design and operations | 2596a(1), (2),
2596(b) and
information to
satisfy Article 4
(where applicable) |

Appendix 3
GENERAL GROUNDWATER MONITORING PLAN

The refinery wide groundwater monitoring plan shall provide a list of the existing groundwater monitoring wells that will be used to monitor each site, boring logs and construction details for each well, rationale for each monitoring well chosen for the monitoring program; methods utilized to measure water level and thickness of floating hydrocarbons in each well; monitoring well purging method; and proposed waste constituents that will be analyzed for at each site. The monitoring parameters chosen for the groundwater monitoring program shall be based on constituents known to be disposed of at each site. (Subchapter 15, Article 5, Section 2596 (3))

Appendix 4
INVESTIGATION SAMPLING PLAN

Submit a site sampling plan which outlines how all future subsurface investigations will be conducted; how all soil and water samples will be collected, the interval of soil sample collection, method of soil sample logging; how boreholes will be geophysically logged; sample container selection, methods of preservation and shipment of the samples, equipment decontamination; and how quality and integrity of these data will be assured and controlled in the field and in the laboratory.

Appendix 5
SITE SPECIFIC GROUNDWATER MONITORING PLAN

This plan shall provide the information required in Appendix 3, for each site, and any location and design details necessary for additional monitoring wells, monitoring well development methods, site specific potentiometric maps. Parameters to be analyzed for at each site must be the results of the site specific report of waste discharge that have been produced for each site (Article 5, and Sections 2596 (3) and 2595 (g)(7)).

APPENDIX 6 TIME SCHEDULE FOR PROVISION 8

INACTIVE SITES	SUBMIT ROWD PLAN	SUBMIT ROWD REPORT	SUBMIT GW MONIT. PLAN	COMPLY GW MONIT. PLAN	SUBMIT CORR. ACT. PLAN
LANDFILL 15	9/88	6/89	1/89	7/90	10/90
OLD CITY DUMP	9/88	6/89	1/89	7/90	10/90
P. A. SITE	10/89	7/90	10/90	4/92	7/92
GERTRUDE ST.	10/89	7/90	10/90	4/92	7/92
POND 11	1/91	10/91	1/92	7/93	10/93
POND14	1/91	10/91	1/92	7/93	10/93
BIG WHEELS	1/92	10/92	1/93	7/94	10/94

NOTE: Each date shown indicates the first of the month

APPENDIX 6 TIME SCHEDULE FOR PROVISION 11

INACCESSIBLE SITES	SUBMIT GW MONIT. PLAN	COMPLY GW MONIT. PLAN
POND 13	4/92	10/93
UNDER L.F.#1	1/92	7/93
OLD DRUM STOR	4/92	10/93

NOTE: Each report is due at the first of the month

APPENDIX 6 TIME SCHEDULE FOR PROVISION 13

IMPOUND BASINS	SOIL SMPLNG PLAN DUE	SOIL SMPLNG REPT. DUE
LAKE MEAD	7/92	4/93
LAKE RUSHING	7/92	4/93
LAKE SCHRAMM	10/92	7/93
MAJKA DITCH	10/92	7/93
NO. 10 SUMP	1/93	10/93
NO. 7 SUMP	1/93	10/93

Note: Each report is due on the first of the month

APPENDIX 6 TIME SCHEDULE FOR PROVISION 14

OIL/WATER SEPARATORS	SUBMIT INVESTIGATION PLAN	SUBMIT INVESTIGATION REPORT
NO. 15 SEP.	1/90	10/90
NO. 1 SEP.	1/90	10/90
NO. 2 SEP.	4/90	1/91
NO. 13 SEP.	4/90	1/91

NOTE: Each report is due on the first of the month

APPENDIX 6 TIME SCHEDULE FOR PROVISION 15

TANK FARMS	SUBMIT INVESTIGATION PLAN	SUBMIT INVESTIGATION REPORT
TANK FARM #1	7/90	4/91
TANK FARM #2	7/90	4/91
TANK FARM #3	10/90	7/91
TANK FARM #4	10/90	7/91
TANK FARM #5	4/91	1/92
TANK FARM #6	4/91	1/92
TANK FARM #7	7/91	4/92
TANK FARM #8	7/91	4/92
TANK FARM #9	10/91	7/92
TANK FARM #10	10/91	7/92

NOTE: Each report is due on the first of the month

APPENDIX 6 TIME SCHEDULE FOR PROVISION 16

OTHER SITES	SUBMIT INVESTIGATION PLAN	SUBMIT INVESTIGATION REPORT
CPI SEPARATOR	4/93	1/94
HEAT EXCHANGER AREA	4/93	1/94
MUD SUMP	7/93	4/94
RAIL CAR LOADING	7/93	4/94
SRU NEUT. PIT	10/93	7/94
TANK CAR CLEANING	10/93	7/94
TRUCK WASH	1/94	10/94

NOTE: Each report is due on the first of the month